

## ARISE - C-130 Hercules 09/06/14 Science Report

**Aircraft:**

[C-130H Hercules #439](#) ([See full schedule](#))

**Date:**

Saturday, September 6, 2014

**Mission:**

ARISE

**Mission Location:**

Arctic Ocean

**Mission Summary:**

Ice ZigZag-Terra - Flt 3

Today's flight had multiple possible objectives depending on cloud conditions in the area:

1. If clear, or clear below cirrus, then measure sea ice conditions with LVIS doing a sawtooth pattern where the legs extended from clear ocean to marginal sea ice to solid sea ice (an ICEBridge objective).
2. If clear at TERRA overpass time, fly directly beneath a track across open water and into the MIZ with thicker sea-ice. The purpose of this track was to collect a coincident spectral (SSFR) and broadband (BBR) albedo dataset to test a MODIS scene type classification method that is used to select the anisotropic directional models used to convert CERES radiances to broadband albedo.
3. If cirrus above aircraft, coordinate with the Terra satellite overpass to do a comparison of cirrus retrievals from MODIS (above cloud) and 4STAR/SSFR (below cloud); 3. If low stratus, then do radiation/probe profiles through stratus over sea ice.

The flight scientist today was Anthony Bucholtz (NRL). The C-130 flew to an area east of 140W to take measurements over a tongue of sea ice extending south toward the Canadian coast. Pre-flight weather indicated cirrus in that area and possible low altitude stratus on the northern portion of the track and a variety of cloud conditions were encountered by the C-130 during the flight. All of the objectives were met except for #2 due to the cloudy conditions beneath the TERRA track.

Some excerpts from the flight scientist's notes:

*?Once in the area of interest, on the first leg to the NE there was scattered thin cirrus and broken low stratus over broken, scattered ice. Near the end of the first track the high clouds became more multi-layered with high, very scattered cirrus above, cloud near or just below our altitude, then thin, broken stratus below. The ice was still broken but more homogeneous. LVIS was able to see to the surface.*

*The Terra overpass occurred at approx 13:45 local as we reached the 1st waypoint. We were above the multi-layered midlevel clouds with cirrus above at the time of the overpass. We extended this leg by 5 minutes to give us straight and level flight before and after the overpass.*

*The 2nd leg of the track initially had a solid cloud deck below with wispy cirrus above. As we got closer to the southern portion of this leg the multi-level cloud below start thinning out and LVIS began seeing the surface again. But the cirrus above began thickening up near the southern part of this leg.*

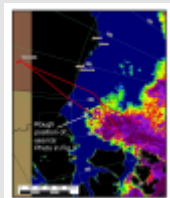
*On the 3rd leg to the NE the low cloud was thicker again and LVIS could not see through it. But the cirrus lessened as we headed further north. We decided to go to the end of this line, reverse course back along the line to try and do radiation/probe profiles through the solid lower cloud deck. However, at the NE end of the leg the lower cloud got more broken and multi-layered. We reversed track and stayed at altitude initially to try and reach the more solid cloud deck further south. However, when we got back to this area the lower cloud had become more multi-layered and broken. However, we still did a stepped descent all the way down to 500 ft stopping for level legs in the clouds for the probes. We could not reach the wispy cirrus above, the first cloud layer below us had tops at approx 16200 ft, static air temperature of -20C. In this layer the pilots reported some icing. This cloud layer was only about 500 ft thick. We then descended to the lower stratus deck with cloud tops of approx 2200 ft, static temps of -3C and bottoms of approx 1100 ft. The ice below was very scattered.?*

All of the radiometers acquired good data the entire flight. The 4STAR team remarked on an interesting dataset collected below cirrus during Terra overpass and during the below cloud run. The cloud probes acquired about 1-hour of good data. LVIS acquired some nice data over the permafrost sites in northern Alaska on the transit out and about 4-hours of good data over the sea-ice from high altitude.

On the way home the C-130 performed an LVIS roll/pitch maneuver at 5000 ft above an open ocean area and ended the flight with a ramp overpass at 10,000 ft above Eielson for the LVIS GPS.

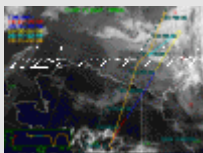
#### Images:

### September 6, 2014 Figure 1



[Read more](#)

### September 6, 2014 Figure 2



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### September 6, 2014 Figure 3



[Read more](#)

#### Submitted by:

William L. Smith Jr. on 09/07/14

#### Related Flight Report:

### C-130 Hercules 09/06/14 - 09/07/14

#### Flight Number:

Ice ZigZag-Terra - Flight #3

#### Payload Configuration:

ARISE

#### Nav Data Collected:

No

#### Total Flight Time:

7.1 hours

#### Submitted by:

Cate Easmunt on 09/06/14

#### Flight Segments:

<b>From:</b>	PAEI	<b>To:</b>	PAEI
<b>Start:</b>	09/06/14 19:10 Z	<b>Finish:</b>	09/07/14 02:15 Z

<b>Flight Time:</b>	7.1 hours		
<b>Log Number:</b>	<a href="#">141002</a>	<b>PI:</b>	Christy Hansen
<b>Funding Source:</b>	Bruce Tagg - NASA - SMD - ESD Airborne Science Program		
<b>Purpose of Flight:</b>	Science		

#### Flight Hour Summary:

	141002	151004
<b>Flight Hours Approved in SOFRS</b>	229	
<b>Flight Hours Previously Approved</b>		88.7
<b>Total Used</b>	140.3	18.2
<b>Total Remaining</b>		70.5

#### 151004 Flight Reports

Date	Flt #	Purpose of Flight	Duration	Running Total	Hours Remaining
<a href="#">10/02/14 - 10/03/14</a>	Cal Flight	Science	8.6	8.6	80.1
<a href="#">10/04/14</a>	Transit	Transit	9.6	18.2	70.5

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*Flight Reports began being entered into this system as of 2012 flights. If there were flights flown under an earlier log number the flight reports are not available online.*

#### 141002 Flight Reports

Date	Flt #	Purpose of Flight	Duration	Running Total	Hours Remaining
<a href="#">08/24/14</a>	Engineering Check Flight	Check	2.8	2.8	226.2
<a href="#">08/29/14</a>	Boom Calibration Flight	Check	0.5	3.3	225.7
<a href="#">08/30/14</a>	Project Check Flight	Check	5.2	8.5	220.5

<a href="#">09/01/14</a>	Transit (1 of 2)	Transit	8.7	17.2	211.8
<a href="#">09/02/14</a>	Transit (2 of 2)	Transit	6.6	23.8	205.2
<a href="#">09/04/14 - 09/05/14</a>	Arctic Ocean - Flight #1	Science	6.6	30.4	198.6
<a href="#">09/05/14 - 09/06/14</a>	140W Sea Ice - Flight #2	Science	7.1	37.5	191.5
<a href="#">09/06/14 - 09/07/14</a>	Ice ZigZag-Terra - Flight #3	Science	7.1	44.6	184.4
<a href="#">09/07/14 - 09/08/14</a>	CERES Gridbox - Flight #4	Science	8.4	53	176
<a href="#">09/09/14 - 09/10/14</a>	CERES Gridbox - Flight #5	Science	7.7	60.7	168.3
<a href="#">09/10/14 - 09/11/14</a>	MIZ Lawnmower - Flight #6	Science	8.8	69.5	159.5
<a href="#">09/11/14 - 09/12/14</a>	CERES Gridbox - Flight #7	Science	7.5	77	152
<a href="#">09/13/14 - 09/14/14</a>	CERES Gridbox - Flight #8	Science	8.3	85.3	143.7
<a href="#">09/15/14 - 09/16/14</a>	CERES Gridbox - Flight #9	Science	8.1	93.4	135.6
<a href="#">09/16/14 - 09/17/14</a>	Radiation Wall Pattern - Flight #10	Science	8.3	101.7	127.3
<a href="#">09/17/14 - 09/18/14</a>	CERES Gridbox - Flight #11	Science	7.2	108.9	120.1
<a href="#">09/18/14 - 09/19/14</a>	Sea Ice Albedo/CryoSat - Flight #12	Science	8.6	117.5	111.5
<a href="#">09/19/14 - 09/20/14</a>	Radiation Wall Pattern - Flight #13	Science	8.3	125.8	103.2
<a href="#">09/21/14 - 09/22/14</a>	Sea Ice & Radiation - Flight #14	Science	8.2	134	95
<a href="#">09/24/14 - 09/25/14</a>	Gridbox TOA+Surface - Flight #15	Science	6.3	140.3	88.7